METHOD AND SYSTEM FOR PRICE SUGGESTING USING ITEM-SPECIFIC ATTRIBUTES

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U.S. Cl. 705/26.1

Field of Classification Search
USPC 705/26.1

See application file for complete search history.

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ABSTRACT
Disclosed are various embodiments for suggesting item prices using item attributes specific to an item classification. One or more input values are received for a set of attributes corresponding to a selected item classification. A user interface is rendered that includes a suggested price range. The suggested price range is determined from a set of historical transaction prices for multiple items that are classified under the selected item classification and match the input value(s) for the set of attributes.

20 Claims, 13 Drawing Sheets
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**Fig. 3**

<table>
<thead>
<tr>
<th>Attribute Table 310</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Type</td>
</tr>
<tr>
<td>0</td>
<td>Condition</td>
</tr>
<tr>
<td>1</td>
<td>Price</td>
</tr>
<tr>
<td>2</td>
<td>Year</td>
</tr>
<tr>
<td>3</td>
<td>Color</td>
</tr>
<tr>
<td>4</td>
<td>Size</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value Table 315</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1 - new</td>
</tr>
<tr>
<td>2 - excellent</td>
</tr>
<tr>
<td>3 - good</td>
</tr>
<tr>
<td>4 - ...</td>
</tr>
</tbody>
</table>

**Item/Attribute Mapping**

<table>
<thead>
<tr>
<th>Item</th>
<th>AH1</th>
<th>AH2</th>
<th>AHN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbie</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Toys</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>123</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Generate Item Web Page

Input selection

Retrieve attributes for corresponding item

Display attribute input fields

Done

Fig. 4
Input Selection

Navigate Browse Hierarchy 501

Select corresponding item 502

Navigate Item Hierarchy 503

Done

Fig. 5
Navigate Browse Hierarchy

601
Select highest level browse category

602
Display sublevels of selected level

603
Wait for input

604
Sublevel selection

605
Leaf

Return selected category

Fig. 6
Retrieve Attributes

Select item at next level

Identify attributes from item/attribute table

Selected item == passed item

Y

Return

N

Fig. 7
Item Hierarchy
Toys
Dolls
Barbie

Transaction Table

<table>
<thead>
<tr>
<th>Model</th>
<th>Condition</th>
<th>Color</th>
<th>Sale Type</th>
<th>Sale Price</th>
<th>Sale Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>1</td>
<td>red</td>
<td>auction</td>
<td>100</td>
<td>1/28/99</td>
<td>3</td>
</tr>
<tr>
<td>123</td>
<td>5</td>
<td>red</td>
<td>sale</td>
<td>50</td>
<td>2/1/99</td>
<td>5</td>
</tr>
<tr>
<td>125</td>
<td>2</td>
<td>green</td>
<td>wanted</td>
<td>75</td>
<td>2/2/99</td>
<td>10</td>
</tr>
<tr>
<td>125</td>
<td>8</td>
<td>green</td>
<td>auction</td>
<td>25</td>
<td>2/4/99</td>
<td>2</td>
</tr>
</tbody>
</table>

Fig. 8
Transaction Price Suggestion

Browse Hierarchy
Toys
Dolls
Barbie

<table>
<thead>
<tr>
<th>Model</th>
<th>Condition</th>
<th>Color</th>
<th>Sale Type</th>
<th>Sale Price</th>
<th>Sale Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>good</td>
<td>red</td>
<td>auction</td>
<td></td>
<td></td>
<td>&lt;3</td>
</tr>
</tbody>
</table>

**Fig. 9**
Transaction Price Suggestion

Browse Hierarchy
- Toys
  - Dolls
    - Barbie

<table>
<thead>
<tr>
<th>Model</th>
<th>Condition</th>
<th>Color</th>
<th>Sale Type</th>
<th>Sale Price</th>
<th>Sale Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>3</td>
<td>red</td>
<td>auction</td>
<td></td>
<td></td>
<td>&lt;3</td>
</tr>
</tbody>
</table>

Based on review of 15 transactions for matching items, we suggest a sale price of $75-$100 to sell the item with the specified duration.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>$50</td>
</tr>
<tr>
<td>Average</td>
<td>$85</td>
</tr>
<tr>
<td>Median</td>
<td>$75</td>
</tr>
<tr>
<td>Maximum</td>
<td>$150</td>
</tr>
</tbody>
</table>

Fig. 10
Transaction Trend Analysis

Browse Hierarchy
  Toys
  Dolls
  Barbie

<table>
<thead>
<tr>
<th>Model</th>
<th>Condition</th>
<th>Color</th>
<th>Sale Type</th>
<th>Sale Price</th>
<th>Sale Date</th>
<th>Duration</th>
<th>...</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>auction</td>
<td>Y</td>
<td>&gt;1/1/99</td>
<td>&lt;3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Display Graph

Fig. 11
Suggest Price

1201 Identify item (item)

1202 Retrieve attributes

1203 Display attribute selection grid

1204 Receive attribute specification

1205 Retrieve transactions that match specification

1206 Calculate statistics

1207 Display statistics

Done

Fig. 12
Generate Transaction Trend

1301 Identify item (item)

1302 Retrieve attributes

1303 Display attribute specification grid

1304 Receive attribute specification + x, y

1305 Retrieve transactions that match attribute specification

1306 Display x, y axes

1307 Display plot

1308 Wait for input

1309 Point selected

Y Display transactions of selected point

N Done

Fig. 13
METHOD AND SYSTEM FOR PRICE SUGGESTING USING ITEM-SPECIFIC ATTRIBUTES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of co-pending U.S. patent application Ser. No. 13/284,672 filed Oct. 28, 2011 and entitled “METHOD AND SYSTEM FOR PRICE SUGGESTING USING ITEM-SPECIFIC ATTRIBUTES,” which is a continuation of U.S. patent application Ser. No. 10/664,820 filed Sep. 17, 2003 and entitled “METHOD AND SYSTEM FOR PRICE SUGGESTING USING ITEM-SPECIFIC ATTRIBUTES,” now issued as U.S. Pat. No. 8,050,974 on Nov. 1, 2011, which is a continuation of U.S. patent application Ser. No. 09/344,787 filed Jun. 25, 1999 and entitled “METHOD AND SYSTEM FOR PRICE SUGGESTING USING ITEM-SPECIFIC ATTRIBUTES,” now abandoned, all of which are hereby incorporated by reference in their entirety.

TECHNICAL FIELD

The described technology relates generally to conducting electronic commerce and, more particularly, to identifying transaction price data for commercial transactions conducted over a computer network.

BACKGROUND

Because it facilitates electronic communications between vendors and purchasers, the Internet is increasingly being used to conduct “electronic commerce.” The Internet comprises a vast number of computers and computer networks that are interconnected through communication channels. Electronic commerce generally refers to the ability to conduct electronic commerce that are at least partially conducted using the computer systems of the parties to the transactions. For example, a purchaser can use a personal computer to connect via the Internet to a vendor’s computer. The purchaser can then interact with the vendor’s computer to conduct the transaction. Although many of the commercial transactions that are performed today could be performed via electronic commerce, the acceptance and widespread use of electronic commerce depends, in large part, upon the ease-of-use of conducting such electronic commerce. If electronic commerce were easily conducted, then even the novice computer user will choose to engage in electronic commerce. Therefore, it is important that techniques be developed to facilitate conducting electronic commerce.

The Internet facilitates conducting electronic commerce, in part, because it uses standardized techniques for exchanging information. Many standards have been established for exchanging information over the Internet, such as electronic mail, Gopher, and the World Wide Web (“WWW”). The WWW service allows a server computer system (i.e., a web server or web site) to send graphical web pages of information to a remote client computer system. The remote client computer system can then display the web pages. Each resource (e.g., computer or web page) of the WWW is uniquely identifiable by a Uniform Resource Locator (“URL”). To view a specific web page, a client computer system specifies the URL for that web page in a request (e.g., a HyperText Transfer Protocol (“HTTP”) request). The request is forwarded to the web server that supports that web page. When that web server receives the request, it sends the requested web page to the client computer system. When the client computer system receives that web page, it typically displays the web page using a browser. A browser is typically a special-purpose application program that executes the requesting of web pages and the displaying of web pages.

Currently, web pages are generally defined using HyperText Markup Language (“HTML”). HTML provides a standard set of tags that define how a web page is to be displayed. When a user indicates to the browser to display a web page, the browser sends a request to the server computer system to transfer to the client computer system an HTML document that defines the web page. When the requested HTML document is received by the client computer system, the browser displays the web page as defined by the HTML document. The HTML document contains various tags that control the displaying of text, graphics, controls, and other features. The HTML document may contain URLs of other web pages available on that server computer system or other server computer systems.

The World Wide Web portion of the Internet is especially conducive to conducting electronic commerce. Many web servers have been developed through which vendors can advertise and sell products and services. The products can include items (e.g., music) that are delivered electronically to the purchaser over the Internet and items (e.g., books) that are delivered through conventional distribution channels (e.g., a common carrier). A server computer system may provide an electronic version of a catalog that lists the items that are available. A user, who is a potential purchaser, may browse through the catalog using a browser and select various items that are to be purchased. When the user has completed selecting the items to be purchased, the server computer system then prompts the user for information to complete the ordering of the items. This purchaser-specific order information may include the purchaser’s name, the purchaser’s credit card number, and a shipping address for the order. The server computer system then typically confirms the order by sending a confirming web page to the client computer system and schedules shipment of the items.

The World Wide Web is also being used to conduct other types of commercial transactions. For example, server computer systems have been developed to support the conducting of auctions electronically, to support a buying service where a user lists an item that the user wants to purchase and specifies the purchase price, and to support fixed-price sale transactions where users advertise their items to be sold. To conduct an auction electronically, the seller of an item provides a definition of the auction via web pages to a server computer system. The definition includes a description of the item, an auction time period, and optionally a minimum bid. The server computer system then conducts the auction during the specified time period. Potential buyers can search the server computer system for an auction of interest. When such an auction is found, the potential buyer can view the bidding history for the auction and enter a bid for the item. When the auction is closed, the server computer system notifies the winning bidder and the seller (e.g., via electronic mail) so that they can complete the transaction. To purchase an item using a buying service, the user identifies the item (e.g., an airline ticket) and a price that they are willing to pay for the item via a web page to a server computer system. The server computer system contacts potential sellers to see if they are willing to sell the item for that price. If a seller is found, the server computer system notifies the buyer and may automatically charge an account of the buyer.

Because of the vast number of commercial transactions being conducted and because of the speed at which they are
being conducted, it can be very difficult to assess what is the
fair market value of an item that is the subject of an electronic
transaction. Because not much information on previous trans-
actions is readily available, sellers listing items at a fixed-
price sale or at an auction may have difficulty setting the fixed
prices, the minimum bid, or a reserve price. Similarly, poten-
tial buyers either at a fixed-price sale or at an auction may not
have a good sense for the fair market value for items. It has
been traditionally very difficult to disseminate readily useful
information about such electronic commercial transactions.
In particular, it has been very difficult to categorize commer-
cial transactions with sufficient specificity to support pricing
analysis. Some server computer systems may use a keyword
approach to help identify related commercial transactions.
The use of keywords has several problems that arise, in part,
from the flexibility that users may have in specifying keywords.
Problems that limit the usefulness of analysis based on key-
words include lack of a common set of keyword, extensive
use of synonyms, and use of words that have multiple unre-
lated meanings (i.e., court for sport and court for law). It
would be desirable to have a technique for categorizing com-
mercial transactions in such a way that useful transaction
price data can be derived.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram illustrating components of the
price suggestion system in one embodiment.

FIG. 2 is a block diagram that illustrates the item classi-
fication hierarchy and the browse category hierarchy.

FIG. 3 is a block diagram illustrating the item/attribute
mapping database.

FIG. 4 is a flow diagram illustrating an example implemen-
tation of a function to generate a web page for an item that is
to be the subject of a commercial transaction.

FIG. 5 is a flow diagram of an example implementation of
the input selection function.

FIG. 6 is a flow diagram of an example implementation of
a function to navigate the browse category hierarchy.

FIG. 7 is a flow diagram of an example implementation of
a function that retrieves attributes for an item classification.

FIG. 8 illustrates a transaction table of the transaction
database.

FIG. 9 illustrates an example display for generating a trans-
action price suggestion.

FIG. 10 illustrates an example display of suggested price
information.

FIG. 11 illustrates an example display of transaction trend
analysis information.

FIG. 12 is a flow diagram of an example implementation of
a suggest price function.

FIG. 13 is a flow diagram of an example implementation of
generate transaction trend function.

DETAILED DESCRIPTION

A method and system for generating transaction price data
using item-specific attributes are provided. In one embodi-
ment, the price suggestion system uses an item classification
hierarchy in which each item classification can have associ-
ated item-specific attributes defined. When commercial trans-
actions (e.g., auctions and fixed-price sales) are conducted,
the items that are the subjects of the commercial transactions
are specified by item classification and item-specific
attributes. By specifying items in such a way the records of
commercial transactions for related items can be readily iden-
tified. The price suggestion system can use these records of
commercial transactions to provide more meaningful trans-
action price data than was previously available. For example,
the price suggestion system may provide a suggested bid
price for the item that is being auctioned based on analysis of
transactions on related items. The price suggestion system
may prompt a user to select an item classification within the
item classification hierarchy. After the user has selected an
item classification, the price suggestion system displays an
indication of the item-specific attributes associated with the
item classification. The user can then specify values or ranges
of values for each attribute. For example, a user may specify
a value of “good” for a condition attribute. Based on the
values specified, the price suggestion system analyzes trans-
actions for items within the item classification that match the
specified attribute values and provides various statistics relat-
ing to those transactions. One such statistic may be a sug-
gested bid for an auction of the item or a suggested price for
a fixed-price sale of the item.

FIG. 1 is a block diagram illustrating components of the
price suggestion system in one embodiment. The price sug-
gestion system 101 is connected to various client computer
systems 102 through a communications network 103, such as
the Internet. The price suggestion system executes on a server
computer system that may include a central processing unit,
memory, and input/output devices. The components and data
structures of the price suggestion system may be stored on
computer-readable medium such as memory, a disk, or a
CD-ROM and may be transmitted over a computer-readable
transmission medium. The client computer systems may
interact with the price suggestion system using a standard
web browser. The price suggestion system includes a server
engine 104, a fixed-price sale component 105, an auction
component 106, an item classification hierarchy 107, a
browse category hierarchy 108, an item/attribute mapping
109, a price analysis component 110, and a transaction
data base 111. The server engine receives HTTP-request messages
from the client computer systems and responds with HTTP-
response messages. The fixed-price sale component controls
the conducting of the fixed-price sale of items. The fixed-
price sale component allows users to list items that are for sale
at a fixed price and assists the conducting of the transaction
when a buyer is found. The fixed-price sales component may
store a record of each concluded transaction in the transaction
database. The auction component controls the conducting of
auctions. The auction component allows sellers to list items
and bidders to place bids on the items. When an auction
concludes, the auction component coordinates the concluding of
the transaction. The auction component may store record of
each concluded auction in the transaction database. The fixed
price sale component and the auction component support the
specifying of the item classification for an item and of the
associated item-specific attributes. The item classification
hierarchy, as described below in more detail, describes hier-
archical classifications for the items. The browse category
hierarchy, as described below in more detail, describes a
hierarchy of categories for assisting users in selecting items
Although the item classifications and browse categories are
described as being hierarchical, the classifications can be
non-hierarchical. The item/attribute mapping contains a map-
ing from each item classification to the item-specific
attributes relating to that item. The price analysis component
inputs a specification of attribute values for an item classifi-
cation and generates transaction price data based on the trans-
actions that match the specified item classification and
attribute values.

FIG. 2 is a block diagram that illustrates the item classi-
fication hierarchy and the browse category hierarchy. The item
classification hierarchy 200 specifies the hierarchical relationship of items. The item classification hierarchy is represented as a tree structure that includes a root classification 201, intermediate classifications 203, and leaf classifications 202. Classification 203 represents items that are classified as "toys." Within the toys classification are sub-classifications of "action figures," "dolls," and so on. Each item that is the subject of a commercial transaction is preferably classified according to the item classification hierarchy. The classification for an item does not, however, need to be a leaf classification. For example, if a doll is being auctioned, but the seller does not know the sub-classification for the doll, then the doll can be classified in the "doll" classification. In contrast, if the seller knows the specific model number of a BARBIE doll, then the seller can classify the doll within a leaf classification of the item classification hierarchy. The browse category hierarchy 204 may use the browse category hierarchy to browse to the "toys" category and eventually arrive at the "BARBIE" category. In one embodiment, the browse category hierarchy may represent the same hierarchical relationship as the item classification hierarchy. The browse category hierarchy, however, may be distinct. In particular, it may be advantageous to have a browse category hierarchy that places categories corresponding to item classifications much higher in the browse category hierarchy than the corresponding item classifications within the item classification hierarchy. For example, if commercial transactions relating to BARBIE dolls are very popular, then the browse category hierarchy may have a "BARBIE" category at the highest level in the browse category hierarchy. The corresponding "BARBIE" classification in the item classification hierarchy may be many levels down in that hierarchy. In this way, users can quickly see and select categories for the more popular items, rather than having to navigate down many levels of an item classification hierarchy. Each category of the browse category hierarchy may contain information identifying a corresponding item classification in the item classification hierarchy. For example, the "BARBIE" category 211 corresponds to the "BARBIE" classification 204. The browse category hierarchy may also contain categories with no one-to-one correspondence with item classification. For example, BARBIE dolls may be sub-categorized based on the decade in which the doll was manufactured. BARBIE dolls may, however, have no corresponding sub-classification based on decade of manufacturer. Rather, the year in which a BARBIE doll was manufactured may be an attribute of an item classification. In this example, the "BARBIE" sub-category 212 for the decade to 1960 most closely corresponds to the "BARBIE" classification with its attribute value for the year attribute specified as 1960-69. One skilled in the art will appreciate that non-tree hierarchical or non-hierarchical classifications and categories may be used. For example, a BARBIE doll with electronic circuitry may be in a "doll" category and in an "electronics" category. In general, the item classification organization and the browse category organization may each be represented by a general graph organization in which any classification and category may be related to any other classification or category. Also, the correspondence between browse categories and item classifications can be represented by various possible mappings between browse categories and item classifications. For example, the leaf browse categories may each correspond to a sub-graph of the item classifications that include a mapped-to item classification.

The price suggestion system may use a combination of the browse category hierarchy and the item classification hierarchy to classify items and identify attributes for the item. A user would typically browse through the browse category hierarchy until the desired category is found. If that browse category corresponds to a leaf item classification, then browsing is complete because the most specific item classification has been found. If, however, the browse category does not correspond to a leaf item classification, then the price suggestion system may allow the user to browse the sub-tree of the corresponding item classification in the item classification hierarchy. At any time, the user can stop browsing and the item will be classified within the corresponding item classification and based on the associated item-specific attributes.

FIG. 3 is a block diagram illustrating the item/attribute mapping data structure. The item/attribute mapping in one embodiment includes an item/attribute table 305, an attribute table 310, and a value table 315. The item/attribute table includes an entry for each item classification in the item classification hierarchy. Each entry also identifies the attributes that are defined for that item classification. For example, the "BARBIE" classification indicates that it has only one attribute (e.g., "2," which is an index into the attribute table and which relates to the year in which the item was manufactured). The attribute table contains a list of the possible attributes of items. For example, the attribute table may contain an entry for a "condition" attribute and a "price" attribute. The value table contains information describing various lists of attribute values. For example, the attribute of "condition" may have various possible values that include new, excellent, good, and so on. The attribute table may define other item-specific, condition-type attributes, such as one with values specific to the conditions of coins (e.g., "mint" or "uncirculated").

FIGS. 4-7 are flow diagrams illustrating the browsing and use of item specific attributes. FIG. 4 is a flow diagram illustrating an example implementation of a function to generate a web page for an item that is to be the subject of a commercial transaction. This function receives a selection of an item classification and then generates a web page with an indication of the item-specific attributes for that item classification. In step 401, the function receives the selection of the item classification by invoking an input selection function. In step 402, the function retrieves the item-specific attributes that correspond to the item classification by invoking a retrieve attribute function. In step 403, the function displays the retrieved item-specific attributes. The function may then prompt the user to specify values for the item-specific attributes.

FIG. 5 is a flow diagram of an example implementation of the input selection function. The input selection function allows a user to navigate the browse category hierarchy and select a browse category. The function may then allow the user to navigate the item classification hierarchy starting from the item classification corresponding to the selected browse category. The function returns the item classification. In step 501, the function allows the user to navigate the browse category hierarchy and to select a browse category by invoking the navigate browse category hierarchy function. In step 502, the function selects the item classification that corresponds to the selected browse category. In step 503, the function allows the user to navigate the item classification hierarchy to select an item classification. The navigation of the item classification hierarchy is performed in a manner analogous to the navigation of the browse category hierarchy, which is described below. One skilled in the art will appreciate that
while navigating the item classification hierarchy the user may select to navigate back up the browse category hierarchy.

FIG. 6 is a flow diagram of an example implementation of a function to navigate the browse category hierarchy. In step 601, the function selects the highest level browse category. In step 602, the function displays the sub-categories of the selected browse category. In step 603, the function waits for user input. In step 604, if the user input is to select a sub-category, then the function continues at step 605, else the function returns the selected browse category. In step 605, if the selected browse category corresponds to a leaf category, then the function returns the selected browse category, else the function loops to step 601 to display the sub-categories of the selected category.

FIG. 7 is a flow diagram of an example implementation of a function that retrieves attributes for an item classification. This function is passed an item classification and returns the associated item-specific attributes. The attributes returned include the attributes for that item classification and any attributes inherited from higher-level item classifications. Inheritance and multiple inheritance of attribute values are described in Snyder, A., “Encapsulation and Inheritance in Object-Oriented Programming Languages,” Object-Oriented Fundamentals, Association for Computing Machinery (1986), which is hereby incorporated by reference. In step 701, the function selects the next lowest level item classification starting with the highest level item classification. In step 702, the function identifies the attributes of the selected item classification from the item/attribute table. In step 703, if the selected item classification is the same as the passed item classification, then the function returns with all the identified attributes, else the function loops to step 701 to select the next lowest level item classification.

FIGS. 8-13 illustrate the operation of the price analysis component of the price suggestion system. FIG. 8 illustrates a transaction table of the transaction database. The transaction table 800 corresponds to the “BARBIE” item classification. This transaction table stores a description of each transaction for any type of BARBIE doll. That is, in this example, the transaction database does not have a separate table for each sub-classification of the “BARBIE” classification. Thus, the transaction table includes a model field to identify the model sub-classification within the BARBIE classification. The transaction table also contains the field for each attribute associated with the model classification. For example, the attributes may include condition, color, sale type, sale price, sale date, duration, year, and so on.

FIG. 9 illustrates an example display for generating a transaction price suggestion. In this example, the user has browsed to the “BARBIE” browse category, which corresponds to the “BARBIE” item classification. In response, the price analysis component retrieved the attributes associated with the BARBIE item classification. The price analysis component then displayed the attribute specification grid 901. The first row of the attribute specification grid contains the name of the attributes. The second row of the attribute specification grid is for the user to specify the attribute values. In this example, the user specified that the model number is “123,” the condition is “good,” the color is “red,” the sale type is “auction,” and that the duration is “<3.” Thus, the user has specified that a price should be suggested for a model 123 BARBIE doll, that is in a good condition, that is red, and that is the subject of an auction that will last less than 3 days. After the user inputs the attribute values, the user selects the suggested price button 902. If the user had browsed down to the “123” classification, then the attribute specification grid would not have included the model attribute.

FIG. 10 illustrates an example display of suggested price information. This display lists the browse category hierarchy 1000 and the attribute specification grid 1001. The display also includes a suggested price field 1002 and a statistics table 1003. In this example, the price suggestion system suggested that a sale price of between $75 and $100 would be needed to sell the BARBIE doll in less than three days. The suggested price could in general be interpreted to be a fair market value which can be used when listing an item to be auctioned, when bidding on an item at an auction, or when purchasing an item at a fixed price. In this example, the statistics table includes a minimum, average, median, and maximum price. The statistics table may also include other information such as the mean, mode, and standard deviation. The display also includes various buttons 1004 by which the user can review the details of the underlying transactions, list an item matching these attributes for sale at a fixed price or at an auction, and place a bid on an item matching these attributes.

FIG. 11 illustrates an example display of transaction trend analysis information. A transaction trend analysis provides a graph that illustrates the trend in transactions based on selected item classification and attribute values. In this example, the price analysis component displays a graph with x and y coordinates as specified by the user. The price analysis component displays the attribute specification grid 1101. The user then enters the attribute values in the second row of the attribute specification grid. In this example, the user selected to graph the condition of the item versus the sale price of the item as indicated by the “X’” and “Y’” in the condition field and the sale price field. The user also indicated to restrict the trend analysis to review of auction transactions with the duration of less than 3 days and with a sale date later than Jan. 1, 1999. After the user filled in the second row of the attribute specification grid, the user selected the display graph button 1102. In response to the selection of the display graph button, the price analysis component retrieved the transactions that matched the attribute specification and displayed a graph of the sales price versus condition. In this example, the price analysis component performed a curve fitting analysis to generate a smooth curve. One skilled in the art would appreciate that a graph may also be represented as scattered data where each transaction is represented by a point on the graph. In one embodiment, when a user selects the point on the graph using a pointing device, such as a mouse and a cursor 1106, the price analysis component displays the underlying transaction data relating to that point. For example, the transaction data may be displayed in tabular format that is similar to that of FIG. 8.

FIG. 12 is a flow diagram of an example implementation of a suggest price function. The suggest price function identifies an item classification, receives an attribute specification for that item classification, and then suggests a price based on the item classification and attribute specification. In step 1201, the function invokes the identify item function to identify an item classification. In step 1202, the function invokes the retrieve attributes function to retrieve the attributes associated with the identified item classification. In step 1203, the function displays an attribute specification grid based on the retrieved attributes. In step 1204, the function receives an attribute specification from the user. In step 1205, the function retrieves the transactions from the transaction database that match the attribute specification. In step 1206, the function calculates statistics based on the retrieved transactions, which may include a suggested price. In step 1207, the function displays the statistics and then completes.

FIG. 13 is a flow diagram of an example implementation of a generate transaction trend function. This function identifies
an item classification, receives an attribute specification for that item classification, and then displays a graph summarizing the transaction information. In step 1301, the function invokes the identify item function to identify an item classification. In step 1302, the function retrieves the attributes associated with the identified item classification by invoking the retrieve attributes function. In step 1303, the function displays an attribute specification grid based on the retrieved attributes. In step 1304, the function receives the attribute specification along with an “X” and “Y” coordinate specification from the user. In step 1305, the function retrieves the transactions that match the item classification and attribute specification. In step 1306, the function displays the axes for the graph. In step 1307, the function generates and displays the graph. In step 1308, the function waits for input from the user. In step 1309, if the input is to select a point on a graph, then the function continues in step 1310, else the function completes. In step 1310, the function displays the transactions associated with the selected point and then loops to step 1308 to wait for additional input.

Based upon the above description, it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. For example, one skilled in the art will appreciate that many different analyses can be performed or transactions that have been specified using item specific attributes. Also, one skilled in the art would appreciate that item-specific attributes can be used independently of navigation technique for identifying classifications. In one embodiment, the item-specific attributes can be used when item classifications are identified using key word searching. Accordingly, the invention is not limited except as by the appended claims.

The invention claimed is:

1. A system comprising:
   a first computing device configured to:
   receive from a second computing device at least one input value specified by a user for a set of attributes corresponding to at least one of a plurality of item classifications;
   determine a suggested price range from a set of historical sale prices for a plurality of items that are classified under the at least one of the item classifications, the plurality of items matching the at least one input value for the set of attributes; and
   encode a user interface for rendering by the second computing device, the user interface including the suggested price range.

2. The system of claim 1, wherein the first computing device is further configured to encode another user interface for rendering by the second computing device, the other user interface including the set of attributes associated with the at least one of the item classifications, the other user interface being configured to obtain the at least one input value for the set of attributes from the user.

3. The system of claim 1, wherein the first computing device is further configured to receive a selection by the user of the at least one of the item classifications from the second computing device.

4. The system of claim 1, wherein each of the plurality of item classifications is associated with a respective one of a plurality of sets of attributes.

5. The system of claim 1, wherein the first computing device is further configured to determine a price statistic from the set of historical sale prices, and the user interface includes the price statistic.

6. The system of claim 5, wherein the price statistic corresponds to at least one of: a minimum price, a maximum price, an average price, or a median price.

7. The system of claim 1, wherein the user interface further includes a graph based at least in part on the historical sale prices and a corresponding value of at least one of the set of attributes for each respective one of the plurality of items.

8. The system of claim 1, wherein the historical sale prices relate to a plurality of fixed-price sales by a plurality of sellers in an electronic marketplace.

9. The system of claim 1, wherein the user interface is configured to obtain a price input value specified by the user for a fixed price of a particular item to be offered in an electronic marketplace, and the first computing device is further configured to:
   receive the price input value specified by the user from the second computing device; and
   configure the electronic marketplace to include a listing for the particular item having the price input value as the fixed price, the particular item being classified under the at least one of the item classifications, the item having the at least one input value for the set of attributes.

10. The system of claim 1, wherein the user interface includes an interface for listing a particular item for sale in an electronic marketplace, the particular item being classified under one of the item classifications, the item being included in the at least one input value for the set of attributes.

11. The system of claim 1, wherein the first computing device is further configured to:
   receive a desired offering length specified by the user from the second computing device; and
   determine the suggested price range based at least in part on the desired offering length.

12. A computer-implemented method comprising:
   receiving, by a computing device, at least one input value for a set of attributes corresponding to a selected at least one of a plurality of item classifications;
   determining, by the computing device, a suggested price range from a set of historical transaction prices for a plurality of items that are classified under the selected at least one of the item classifications, the plurality of items matching the at least one input value for the set of attributes; and
   rendering, by the computing device, a user interface that includes the suggested price range.

13. The computer-implemented method of claim 12, wherein the user interface further includes a graph based at least in part on the historical transaction prices and a corresponding value of at least one of the set of attributes for each respective one of the plurality of items.

14. The computer-implemented method of claim 12, further comprising rendering, by the computing device, another user interface that includes the set of attributes associated with the selected at least one of the item classifications, the other user interface being configured to obtain the at least one input value for the set of attributes.

15. The computer-implemented method of claim 12, wherein the user interface is configured to obtain a price input value for a fixed price of a particular item which is to be listed in an electronic commerce system, and the computer-implemented method further comprises:
   receiving, by the computing device, the price input value; sending, by the computing device, the price input value to the electronic commerce system; and
   wherein the electronic commerce system is configured to include a listing for the particular item having the price input value as the fixed price, the particular item being...
classified under the selected at least one of the item classifications and having the at least one input value for the set of attributes.

16. The computer-implemented method of claim 12, further comprising rendering, by the computing device, another user interface that is configured to facilitate a selection of the selected at least one of the item classifications based at least in part on a subset of the item classifications that match at least one user-specified keyword.

17. The computer-implemented method of claim 12, wherein the suggested price range includes a suggested maximum price and a suggested minimum price.

18. A non-transitory computer-readable medium embodying a program executable in a computing device, wherein when executed the program causes the computing device to:
   determine at least one of a plurality of item classifications;
   determine a set of attributes associated with the at least one of the item classifications;
   receive at least one user-specified input value for the set of attributes;
   determine a suggested price range based at least in part on a set of historical transaction prices for a plurality of items that are classified under the at least one of the item classifications, the plurality of items matching the at least one user-specified input value for the set of attributes; and
   encode a user interface that includes the suggested price range.

19. The non-transitory computer-readable medium of claim 18, wherein the user interface further includes a graph based at least in part on the historical transaction prices and a corresponding value of one of the set of attributes for each respective one of the plurality of items.

20. The non-transitory computer-readable medium of claim 18, wherein when executed the program is further configured to:
   receive a user-specified desired offering length; and
   determine the suggested price range based at least in part on the user-specified desired offering length.

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